

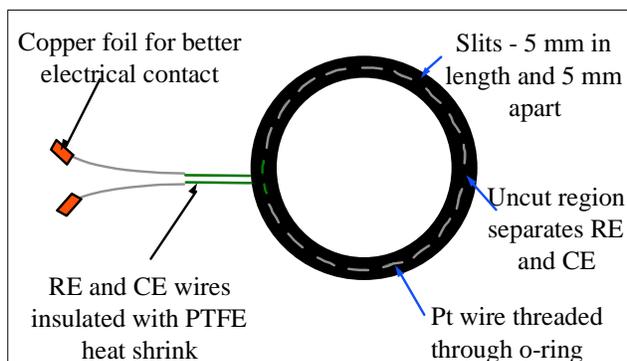
FARADAYIC[®] Process and Hidden Corrosion Detection

Objective:

This project demonstrated the feasibility of hidden corrosion detection using o-rings with embedded electrodes.

Summary:

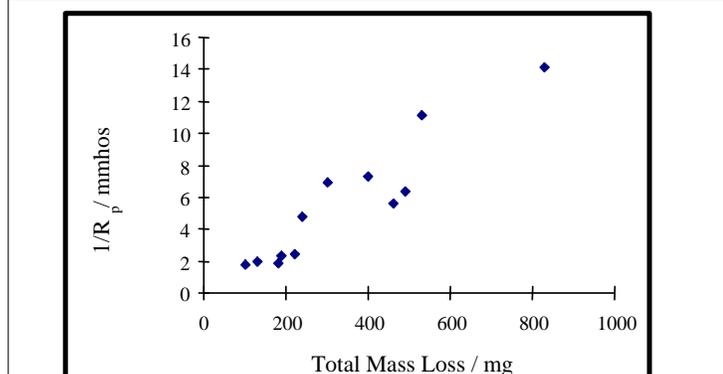
Faraday has developed a novel approach for in-situ detection and monitoring of hidden corrosion occurring at mated surfaces. This technology uses embedded electrodes to address the problem of both detection and mitigation of crevice corrosion in any component where mated surfaces are joined, especially when mated with o-rings or gaskets. This embedded electrode technology is designed to deliver an electrochemical signal to creviced components to remotely detect, and monitor the corrosion activity within a mated surface without the need for unit disassembly. Furthermore, this technology could also be appropriate as a corrosion prevention “countermeasure” for in-situ, real-time corrosion prevention for flanges, pumps, propeller shafts, or any mated surface susceptible to hidden corrosion attack. The SMART-O[™] sensor technology was tested in piping loops at Wrightsville Beach, NC and Key West, FL, under 2000 psi with no degradation in flange integrity.



Qualitative data using EIS and visual inspection depicting change in polarization resistance monitored by the SMART-O[™] Instrument and flange material, immersed in 3.5% NaCl solution under crevice conditions.

Immersion Time (hrs)	R _p (Ohms)	Specimen Condition
0.0	1641	No crevice corrosion
18.0	88	Light, discontinuous crevice corrosion attack
24.0	71	Light, discontinuous crevice corrosion attack
48.0	67	Light, discontinuous crevice corrosion attack
96.0	48	Light, continuous crevice corrosion attack

Quantitative data using EIS depicting the correlation between a change in polarization resistance monitored by the SMART-O[™] Sensor with actual mass loss of the flange material.



Background:

The patented FARADAYIC[®] Process is an electrochemical technology that utilizes a controlled electric field to address industrial problems. Faraday’s expertise with electrochemical techniques is applied to solving material degradation problems.

The FARADAYIC[®] Process technology illustrated above is protected by a substantial patent portfolio including issued, allowed, and pending patent actions.